

Building skins as open border between building and territory

Original

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Silvia Barbero, PhD

Assistant professor

Politecnico di Torino -
Department of
Architecture and
Design

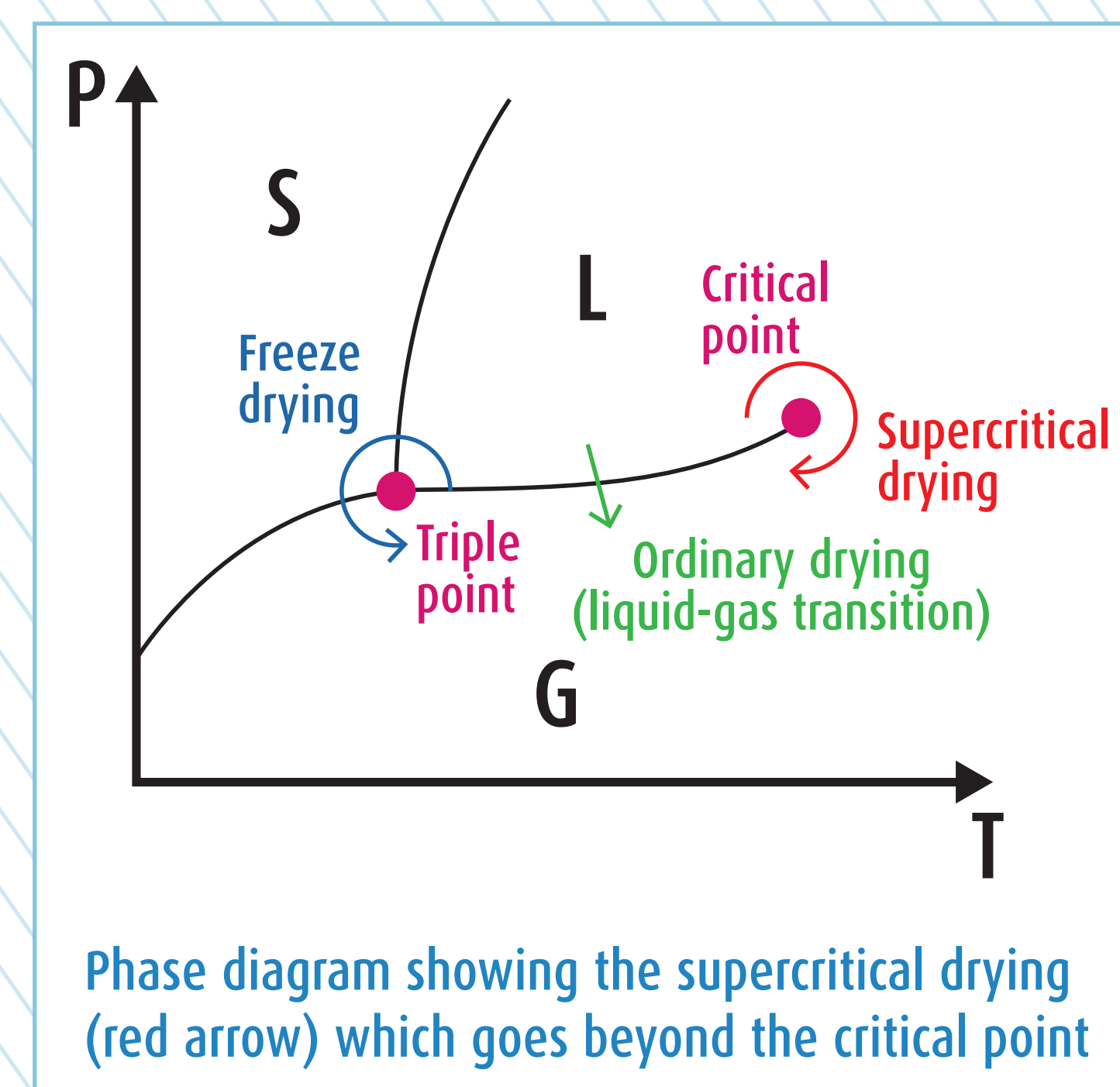
silvia.barbero@polito.it

THE BUILDING SKINS AS OPEN BORDER BETWEEN BUILDING AND TERRITORY

The concept

HIPIN (High Performance Insulation Based on Nanostructured Encapsulation of Air) project aims to develop a **sustainable and affordable technology to produce a nanostructured thermal insulating layer** to improve thermal efficiency in new buildings and retrofitting of existing buildings.

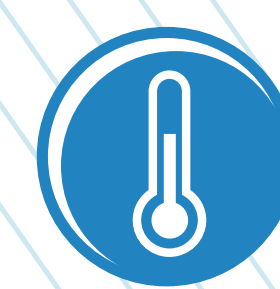
HIPIN aerogel



Phase diagram showing the supercritical drying (red arrow) which goes beyond the critical point

Starting from **TEOS** ($R=CH_3-CH_2-$), **IMS**, **DI water** and **HCl**:

- 1) Sol gel route: hydrolysis and condensation reactions;
- 2) Heating to promote **first level of hydrolysis/ condensation**;
- 3) Second hydrolysis/condensation step to **give an alcogel**;
- 4) Supercritical drying to **give an Aerogel**.



HIGH THERMAL
INSULATING EFFECT



HIGH ROBUSTNESS



FIRE RETARDANT



AFFORDABLE



EASY TO MIX



LONG TERM PERFORMANCE

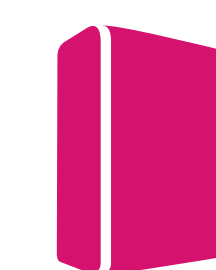
Incorporation into building materials

3 THERMAL INSULATING SYSTEMS



THERMAL PAINT

Solventless (VOC regulation)
Stable for **2 years/wet** and **5 years/dry**
Colour and gloss are stable over time
Thickness 20-50µm (dry-film)
Thermal Conductivity < **0.7 W/mK**



THERMAL PLASTER

Pre-mixed (fast application)
Finishing and paintable
Breathable
Thickness < **45 mm**
Dry bulk density < **250 kg/sqm**
Thermal Conductivity < **0.03 W/mK**

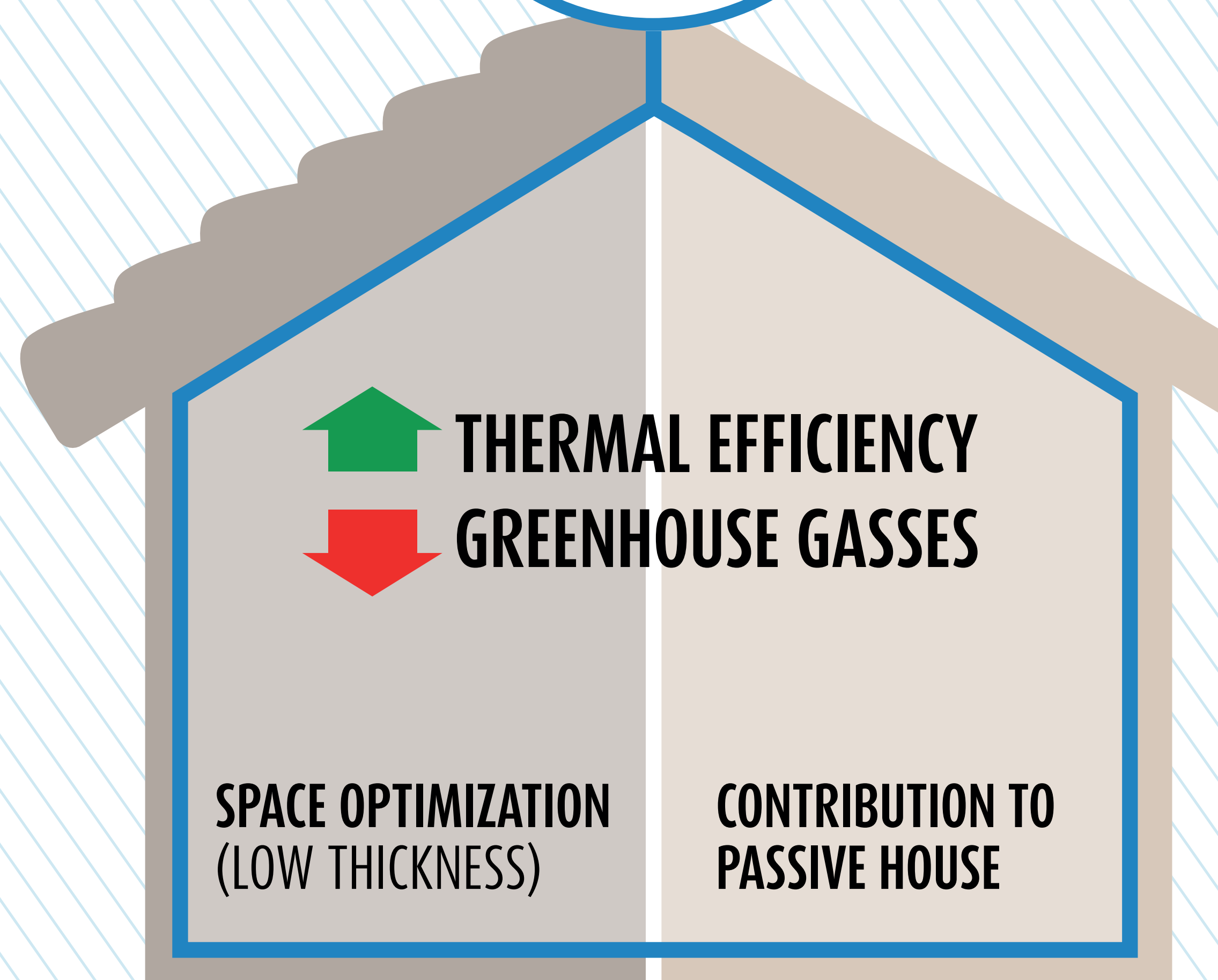


THERMAL PANELS

Fast application
Vapour diffusion
Thickness < **30 mm**
Thermal Conductivity < **0.013 W/mK**

NANOSTRUCTURED THERMAL
INSULATING SYSTEMS

hipin®



EXISTING BUILDING NEW BUILDING

ACKNOWLEDGEMENTS

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